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ABSTRACT

Annotations of tests measuring motor development, cognitive growth, intelligence, mental health, social maturity, and concept attainment in infants from birth to 24 months of age are presented. Information is given concerning test purpose; intended groups; test subdivisions or tested skills, behaviors, or competencies; administration; scoring; interpretation; and standardization. (MS)

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HEAD START

TEST COLLECTION REPORT

MEASURES OF INFANT DEVELOPMENT

An Annotated Bibliography

TM 001 020

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MEASURES OF INFANT DEVELOPMENT

An Annotated Bibliography

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Head Start Test Collection
Educational Testing Service

INTRODUCTION

This annotated bibliography is concerned with a variety of measures of development appropriate for use with infants from birth to 24 months of age. Included are tests designed to measure motor development, cognitive growth, intelligence, mental health, social maturity, concept attainment, and the like. Instruments which assess an extremely narrow range of behaviors have been excluded.

The instruments described were found through a search of *Research in Education*, the *Current Index to Journals in Education*, and among the documents held by the Test Collection of Educational Testing Service and the libraries of Rutgers - The State University of New Jersey.

The main descriptive section conforms to normal bibliographic practice in listing the tests alphabetically by first author, followed by the test title, the source from which the instrument may be obtained, and the copyright date (indicated by a small c) or the publication date (indicated by a small p). The absence of a copyright date is not intended to suggest that the instrument is uncopyrighted. In a few cases, no individual author was noted; these instruments appear at the end of the bibliography.

The annotation provides information concerning the purpose of the test; the groups for which it is intended; test subdivisions or tested skills, behaviors, or competencies; administration; scoring; interpretation; and standardization. Number references in parentheses in the text are keyed to the reference list which follows the bibliography.

Certain terminology and ground rules used in preparing the bibliography are explained below:

A. Test Title

Sometimes an instrument does not appear to have an "official" identifying label. In such cases, an appropriate name has been provided. When a measure is known by more than one name, the alternatives are indicated.

B. Age Range

The range should be considered as a guide only. Listed here is the age range for which the measure is intended (as stated by the author), or the range from which data was obtained. The age range listed may well be arbitrary and should not necessarily be viewed as ultimate limits.

C. Forms

If forms are not mentioned in an annotation, only one form of the test is available.

D. Timing

An instrument may be described as "timed," "untimed," or "paced." The latter means that the examiner reads the instructions and items to the examinee. When available, the approximate time required for administration is indicated.

E. Scoring

Unless otherwise indicated, scores are derived directly from the responses of the subject, usually by a summative process. The great majority of the tests are hand scored, any variations are noted.

F. Technical Data

In this area, only the kinds of norms available and the types of studies performed are reported. The content, results, or quality of the studies made are not indicated. If a reader finds a test of interest, he should examine the technical report in detail to determine whether that particular test is appropriate for his purpose.

Reliability studies show whether an instrument gives consistent results. Intra-scorer or intra-examiner reliability is the correlation between the results obtained when a single examiner scores the same set of tests more than once. Inter-scorer or inter-examiner reliability is the correlation between the results obtained when different examiners score the same set of tests. Odd-even, split-half, Kuder-Richardson 20, Kuder-Richardson 21, alpha, and Spearman-Brown correlations are all measures of internal consistency. A test-retest study indicates that the same form of the same test has been administered to the same group of examinees at two different times and the results correlated. When parallel forms of the same test have been given to a group of examinees and the results correlated, the correlation is called parallel form or inter-form reliability.

Validity studies indicate whether an instrument measures the skills, abilities, competencies, or traits which it purports to measure. One type of validity is concerned with the appropriateness of the test items according to some definition; for example, a statement of instructional objectives, the psychological definition of a concept, etc. Such validity is called content or construct validity. Another type of validity is determined by the correlation between the scores on an instrument and some other external measure of the same quality or attribute. For example, in a concurrent validity study the results of two measures taken on the same group of examinees at approximately the same time are correlated; in a predictive validity study the scores from a given test are correlated with those of a different measure taken at a later date.

Table of Contents

	Page
Albert Einstein Scales of Sensori-Motor Development	18
Apgar Test	4
Bayley Scales of Infant Development	5
Behavioral Differences Between Normal and Traumatized Newborns Test	13
Behavioral Individuality in Early Childhood Measure	17
Bell Object Scale	6
Bell Person Permanence Scale	6
Buhler Baby Tests	7
California Infant Scale of Motor Development	5
California Scales of Infant Mental Development	6
Cattell Infant Intelligence Scale	8
Composite Developmental Inventory for Infants and Young Children	8
Denver Developmental Screening Test	10
Fantz-Nevis Visual Preference Test	9
Frichtl-Peterson Tool for the Assessment of Motor Skills	10
Gesell Developmental Schedules	11
Griffiths Abilities of Babies Scale	13
Griffiths Mental Development Scale	13
Hetzer-Wolf Baby Tests	7
Infant Rating Scale	13
Infant Security Scales	10
Irwin Speech Sound Development Test	14
Kahn Intelligence Tests: Experimental Form	14
Kuhlmann-Binet Intelligence Scale	15
Kuhlmann Tests of Mental Development	15
Maxfield-Buchholz Scale of Social Maturity for Use with Preschool Blind Children	15
Merrill-Palmer Preschool Performance Tests	17
Merrill-Palmer Scale of Mental Tests	17
Minnesota Preschool Scale	11
Objectal Scale	12
Piaget Object Scale	11
Piaget Series	12
Pre-Linguistic Infant Vocalizations Analysis	16
Preschool Attainment Record	8
Ricciuti Object Grouping and Selective Ordering Tasks	16
Ring and Peg Tests of Behavior Development, Revised Edition	4
Shield Speech and Language Developmental Scale	19
Slosson Intelligence Test for Children and Adults	17
Viennese Test Series	7
Vineland Social Maturity Scale, Fourth Edition	9
White-Held Visually-Directed Prehension Test	18

Apgar, V. *Apgar Test.*

From: Virginia Apgar, 30 Engle Street, Tenafly, New Jersey 07670 (p1953).

Assesses the physical condition of a baby at birth. The five conditions rated are as follows: heart rate, respiratory efforts, reflex irritability, muscle tone, and color. A rating made one minute after birth is most useful in indicating the need for prompt treatment. A five-minute rating is more predictive of survival probability or significant neurologic damage. If only one is to be done, the former is recommended. The test is untimed and based on individual observations. Some experience is needed. It is recommended that the scoring be done by an observer such as the anesthetist, not the attending physician. Total score rates and frequencies for thousands of births are reported (1, 2, 3). Validity studies are presented. No other technical data was available for review.

Banham, K. M. *Ring and Peg Tests of Behavior Development, Revised Edition.*

From: Psychometric Affiliates, Chicago Plaza, Brookport, Illinois 62910 (c1964).

Designed to assist in the estimation of the level of general behavior development in children from birth to 6 years. It includes not only tests of adaptive perceptual, ideational, motor, and linguistic behavior, but also attempts to measure development in social cooperation, personal independence, interest, drive, and purpose. The test items are arranged in five behavioral categories: Ambulative, Manipulative, Communicative, Social Adaptive, and Emotive Development. The test materials include pencils, paper, shoelaces, plastic pegs and rings, and a box. Alternate items are available for every behavior item. The subtests are arranged in age group sequence. A particular child need take only those subtests which are appropriate to his behavioral age. Subtests at 1-month intervals, starting at age 1 month, are available for the child less than 1 year old, at 2-month intervals for the child of age 1 to 2, and at 6-month intervals for the child of age 2 to 6. The test yields age scale or point scale scores, the latter being most useful for diagnostic purposes, behavior development ages for each of the scales, and overall development quotient. The test is designed for individual administration by a doctor, pediatrician, clinical psychologist, or psychiatrist. The examiner should have considerable experience in the testing of young children and some practice with the test materials. Odd-even reliabilities, validations of behavior subtests against age, and correlations with *Cattell Infant Intelligence Scale* and *Stanford-Binet* scores are reported.

Bayley, N. *Bayley Scales of Infant Development.*

From: The Psychological Corporation, 304 East 45th Street, New York, New York 10017 (c1969).

Assesses developmental status in infants from birth to 30 months of age. The Mental Scale (163 items) measures sensory-perceptual acuities and discriminations; early acquisition of object constancy and memory, learning, and problem-solving ability; vocalizations and the beginning of verbal communication; and early evidence of the ability to form generalizations and classifications. The Motor Scale (81 items) measures the degree of control of the body, coordination of the large muscles, and finer manipulatory skills of the hands and fingers. Each of these items has an age placement to the nearest one-tenth of a month and an age range. The last part of the test is an Infant Behavior Record, consisting of 30 ratings, which is completed by the examiner, after the Scales have been administered, on the basis of his observations. It deals with social orientation, emotional variables, object relations, motivational variables, activity, reactivity, sensory areas of interest displayed, and general evaluations. Some props are needed. A kit of the materials used for the norming groups is available. The test is untimed (although certain items are timed) and individually administered. Training is needed. The mother (or mother substitute) is present during the test. Average testing time for the Mental and Motor Scales is 45 minutes with about 10% of the cases requiring 75 minutes or more. Raw scores may be converted to Mental Development and Motor Development Indices, scores standardized by age with a mean of 100 and standard deviation of 16, or to mental ages. Evidence of face validity is presented. Split-half, test-retest and tester-observer reliabilities, and correlations with *Stanford-Binet* I.Q.s for sample members aged 24, 27, and 30 months are reported.

Bayley, N. *California Infant Scale of Motor Development.*

A copy of the instrument may be examined in: Nancy Bayley, The development of motor abilities during the first three years, *Society for Research in Child Development Monographs,* 1935, 1 (1), 1-26. Also a reprint of the same, Kraus Reprint Corporation, 16 East 46th Street, New York, New York 10017.

Measures motor development in infants from birth to age 3 years. The instrument has 76 items in the areas of manual coordination, motion, and anti-gravity behavior. The items are arranged in order of difficulty and each item is age placed to the nearest one-tenth of a month. A few props are needed. The test is untimed and individually administered. The examiner should have considerable experience with the testing of infants and some practice with the test materials. Age norms by total sample and by sex are available. Split-half and test-retest reliabilities, predictive validities, and correlations with *California First Year Mental Scale* scores, body-build indices, age of first pre-walking progression, and age of first walking are reported.

Bayley, N. *California Scales of Infant Mental Development.*

A copy of the instrument may be examined in: Nancy Bayley, Mental growth during the first three years, *Genetic Psychology Monographs*, 1933, 14 (1), 7-92.

Assesses mental growth or intelligent behavior in infants from birth to 3 years of age. The *California First Year Mental Scale* is included. The 185 items are concerned with motor maturation, eye-hand coordination, adaptive coordination, adaptive behavior, reactions to sound, visual maturation, language comprehension, vocalizations, and social responses. Each item is age placed to the nearest one-tenth of one month. The test is untimed and individually administered. The examiner should have considerable experience in the testing of infants and some practice with the test materials. Less than 45 minutes are required. Age total score means and medians by total sample and by sex, and split-half and test-retest (one month or more between the tests) reliabilities are reported. A wealth of other technical data is available.

Bell, S. M. *Bell Object Scale.*

From: NAPS Document 00965, ASIS National Auxiliary Publications Service, c/o CCM Information Sciences, Inc., 866 Third Avenue, New York, New York 10022 (p1970).

Assesses the development of the object permanence concept in infants of age 5 months to 2 years. The instrument is based on the theory and works of Piaget. The 11 items, involving 15 behaviors, deal with various visible and invisible displacements and sequences of displacements. Some props are needed. The test is untimed and individually administered. The examiner should have experience in the testing of infants and some practice with the test materials. Mean scores for various samples of infants and test-retest reliabilities are reported (4). No other technical data was available for review.

Bell, S. M. *Bell Person Permanence Scale.*

From: NAPS Document 00965, ASIS National Auxiliary Publications Service, c/o CCM Information Sciences, Inc., 866 Third Avenue, New York, New York 10022 (p1970).

Assesses the development of the person permanence concept in infants of age 5 months to 2 years. The instrument is based on Piagetian theory and has 11 items which are the analogues of those on the *Bell Object Scale* described above. In this case, it is the mother (or occasionally the examiner) who is hidden. Some props are needed. The test is untimed and individually administered. The examiner should have experience in the testing of infants and some practice with the test materials. Mean scores for various samples of infants and test-retest reliabilities are reported (4). No other technical data was available for review.

Buhler, C., & Others. *Buhler Baby Tests; Hetzer-Wolf Baby Tests.*

A copy of the instrument may be examined in: Charlotte Buhler, *The first year of life.* New York: The John Day Company, 1930.

Identifies the stage of development or maturity in infants from 2 months to 2 years of age. Test items are designed to measure bodily control, mental ability, social development, or manipulation of objects. The test measures total developmental age and developmental age with respect to each of the four areas listed above. The instrument has ten items for each 1-month age period for infants 2-11 months old and ten items for each 3-month age period for infants 12-23 months old. Each infant is given the set of items appropriate to his chronological age together with the two sets immediately below and above his age. A number of props are needed. The test is untimed and individually administered. The examiner should have considerable experience in the testing of infants and some practice with the test materials. Odd-even and test-retest reliabilities, mean developmental quotients for various samples of babies, and predictive validities with *Merrill-Palmer Scale* scores are reported by Hubbard (20).

Buhler, C., & Others. *Viennese Test Series.*

A copy of the instrument may be examined in: Charlotte Buhler and Hildegard Hetzer, *Testing children's development from birth to school age.* New York: Farrar & Rinehart, Inc., 1935.

Assesses developmental level in children from birth through age 5. The *Viennese Test Series* is an extensive revision and extension of the *Buhler Baby Tests.* Test items are designed to measure sense reception, bodily movements, social behavior, learning, manipulation of materials, and mental productivity. The *Series* has a total developmental age or developmental quotient and a developmental age with respect to each of the six areas listed above (there are no items in manipulation until the 4th month test and none in mental productivity until the 11th-12th month test). Each test has ten items. Tests are available at the following age levels: monthly through the 8th month of life; 9th-10th, 11th-12th, 13th-15th, 16th-18th, and 19th-24th month of life; and age 2, 3, 4, and 5 years. Each child is given the test appropriate to his chronological age and also the two preceding and two succeeding tests, unless his development is generally accelerated or retarded. Props are needed. The tests are untimed and individually administered. The examiner should have considerable experience in the testing of infants and some practice with the test materials. Administration time is ten minutes to one hour, depending upon the child's age. Pass rates for each test for the appropriate age level are reported (each is close to the planned item cutting value of 66%). Evidence of validity is presented. Odd-even and test-retest reliabilities for the first year tests and selected predictive validities are reported by Herring (19).

Caldwell, B. M., & Drachman, R. H. *Composite Developmental Inventory for Infants and Young Children.*

From: Bettye M. Caldwell, Center for Early Development and Education, 814 Sherman Avenue, Little Rock, Arkansas 72202 (p1964).

Assesses the developmental status of an infant from age 1 month to 2 years. It is designed to be a relatively brief screening procedure for use by pediatricians interested in more than a clinical appraisal. Both observed behavior and parental reports of achievements are utilized in the evaluation. Items are available at the following age levels: monthly through 4 months, quarterly from 6 months through 18 months, and 24 months. At each age level there are from two to five test items and from two to eight parental report items. The score is given as developmental age or developmental quotient. Some props are required. The test is untimed and individually administered. Mean developmental ages and quotients for various samples of infants are available (5). Analyses of variance and correlations with *Cattell Infant Intelligence Scale*, and *Griffiths Mental Development Scale* developmental ages and quotients are reported. No other technical data was available for review.

Cattell, P. *Cattell Infant Intelligence Scale.*

From: The Psychological Corporation, 304 East 45th Street, New York, New York 10017 (c1937, c1940, c1960).

Measures intelligence in children from age 2 months to 30 months. The *Scale* has five items and one or two alternates for each age level. The levels are at 1-month intervals from 2 to 12 months of age, 2-month intervals from 12 to 24 months, and 3-month intervals from 24 to 30 months. The score obtained is the child's mental age. A number of props are needed. The test is untimed and individually administered by a person with a sound background in child psychology, including mental testing of children, and a nursery school training course. Testing time is 20-40 minutes. Item response rates for various age infants are reported (6). Spearman-Brown reliabilities and predictive validities with *Stanford-Binet* scores (36 months) are available.

Doll, E. A. *Preschool Attainment Record (PAR).*

From: American Guidance Service, Inc., Publishers' Building, Circle Pines, Minnesota 55014 (c1966).

Combines an assessment of physical, social, and intellectual functions in a global appraisal of children from birth to 7 years of age. The *Record* includes eight categories of developmental behavior: ambulation, manipulation, rapport, communication, responsibility, information, ideation, and creativity. For each category, there is one item for each 6-month age period. The item types, item arrangement, testing procedures, and interviewer qualifications are the same as for the *Vineland Social Maturity Scale* described next. Mean age for expected performance of each behavior is provided. Total scores may be converted to attainment ages or attainment quotients. No reliability or validity studies are yet available.

Doll, E. A. *Vineland Social Maturity Scale, Fourth Edition.*

From: American Guidance Service, Inc., Publishers' Building, Circle Pines, Minnesota 55014 (c1936-1965).

Assesses progress toward social maturity, competence, or independence in subjects from birth to adulthood. Items are designed to elicit factual descriptions of the examinee's habitual or customary behavior as an established mode of conduct. The items are arranged in order of increasing difficulty and represent progressive maturation in self-help, self-direction, locomotion, occupation, communications, and social relations. Seventeen items are provided for both age level 0-1 and 1-2. Detailed descriptions of the behaviors tapped by each item are available. The mean age for expected performance of each behavior for normal subjects by total sample, by sex, for feeble-minded subjects, and item maturation curves are provided. Total scores may be converted to social ages or social quotients. The *Scale* is scored on the basis of information obtained in an interview with someone intimately familiar with the person scored, or the person himself. The interviewer needs practice and experience in the techniques involved. Illustrative interviews with subjects of various types and ages are available. Test-retest reliabilities, comparisons of social age and social quotients with chronological age, and item validation studies with normal and abnormal populations are reported (9).

Fantz, R. L., & Nevis, S. *Fantz-Nevis Visual Preference Test.*

From: Robert L. Fantz, Department of Psychology, Case Western Reserve University, University Circle, Cleveland, Ohio 44106 (c1967).

Measures developmental level through the assessment of visual preferences in infants from birth to 24 weeks of age. The items consist of 18 pairs of stimulus objects. Each pair is presented, with one object on the left and one on the right, for 20 seconds, and then the objects are reversed and presented for another 20 seconds. Eye fixations are recorded and preference determined by calculating the time spent looking at each of the stimuli. The test is repeated weekly. Scores include age of preference change for each of the pairs, and mean age of change for all pairs, pattern difference pairs, form vs. non-form stimuli, familiar vs. novel stimuli, depth difference pairs, and other assorted variables. A test chamber and stimulus pairs are needed. The items are timed and individually administered. Experience with the technique is needed. An assistant is required. Score frequencies and rates and detailed findings for non-institutional, faculty member babies, institutional babies, and total sample are reported (10). Inter-observer reliabilities, concurrent and predictive validities with a performance test based on the *Griffiths Mental Development Scale*, and other evidences of prediction of later development are available.

Flint, B. M. *Infant Security Scales.*

From: University of Toronto Press, St. George Campus, University of Toronto, Toronto, 181, Canada (c1959).

Designed as a diagnostic check-list for the assessment of the mental health (security) of babies from birth to 2 years of age. It is based on the security theory of W. E. Blatz. The scales consist of a series of items descriptive of the behaviors of infants and indicative of a range of mental health states. The items are grouped according to four age levels: 0 to 6 months, 6 to 12, 12 to 18, and 18 to 24 months. They are also classified as secure, insecure, deputy agent, or regressive items. The test may be scored in three ways, giving a single security score; security quotient scores; or secure, insecure, deputy agent, and regressive rates. The test is based on individual observations of the infant's usual behaviors and questioning of a parent or other observer. The examiner should have considerable experience in the testing of infants. Analyses of scores of well-adjusted and poorly-adjusted children are reported (11). Test-retest reliabilities and validity studies are available.

Frankenburg, W. K., & Dodds, J. B. *Denver Developmental Screening Test (DDST).*

From: Ladoca Project and Publishing Foundation, Inc., East 51st Avenue and Lincoln, Denver, Colorado 80216 (c1967).

A simple, clinically useful tool designed to assist in the early detection of children with serious developmental delays. It may be used with children from age 2 weeks to 6 years. The purpose is screening, not diagnosis. Although the test contains 105 tasks, a child of any given age will usually be tested on about 20 items. The *DDST* evaluates the following areas: gross motor, fine motor-adaptive (use of hands, ability to solve nonverbal problems), language (ability to hear and talk), and personal-social (tasks of self-care, ability to relate to others). The test is individually administered and paced. The examiner should have considerable experience in the testing of young children and some practice with the test materials. Testing materials include a rattle, pencil, box of raisins, bell, tennis ball, glass bottle, some blocks, and some yarn. Task norms which indicate the age at which 25, 50, 75, and 90% of boys, girls, and all children successfully complete each item are available. Test-retest reliability, inter-examiner reliability, and the correlation of the *DDST* with the *Yale Developmental Schedule* are reported.

Frichtl, C., & Peterson, L. W. *Frichtl-Peterson Tool for the Assessment of Motor Skills.*

From: Chris Frichtl, Herman Adler Zone Center, State Department of Mental Health, Champaign, Illinois 61820 (p1969).

Designed to assess the functional level of retarded infants. The test consists of observations of 18 motor skills in the areas of head control and locomotion. The tool is set up to apply the principle that maturation proceeds in a cephalo-caudal direction. The test is accompanied by a set of stimulation exercises for each motor skill (12). These exercises aid the child in developing the desired motor performance. The test is untimed and individually administered. Some experience is needed. No technical data is reported.

Gesell, A., & Associates. *Gesell Developmental Schedules.*

From: The Psychological Corporation, 304 East 45th Street, New York, New York 10017 (c1940-1947).

Assesses the developmental level (or developmental quotient) of children from age 4 weeks to 6 years. Maturity is measured in four major fields of behavior: motor characteristics (postural reactions, prehension, locomotion, general bodily coordination, specific motor skills), adaptive (perceptual, orientational, manual and verbal adjustments, alertness, intelligence, constructiveness), language (soliloquy, dramatic expression, communication, comprehension), and personal-social (personal reactions to other persons and to the impacts of culture, adjustments to domestic life, property, social groups, community conventions). The schedules are individually administered by physicians. Several different forms (schedules), including one for each 4-week period up to 56 weeks of age and one for each 3-month period for age 15-24 months, are available for children of varying ages. A number of props are needed for the test. Developmental norms for the items are available (13, 14). No reliability or validity studies were available for review.

Golden, M., & Birns, B. *Piaget Object Scale.*

From: Mark Golden, Department of Psychiatry, Albert Einstein College of Medicine of Yeshiva University, Morris Park Avenue and Eastchester Road, Bronx, New York 10461 (c1968).

Assesses the development of the object concept in infants from age 5 to 26 months. The *Scale* is based on Piagetian theory and is a modification of the Object Permanence Scale of the *Albert Einstein Scales of Sensori-Motor Development* described later. The ten items deal with visible displacements, invisible displacements and serial invisible displacements. The score is based on the highest item passed. The instrument is untimed and individually administered. The examiner should have considerable experience in the testing of infants and some practice with the test materials. The mother or a mother substitute is present during the test. Median Scale scores and score ranges by age and social class are reported (15). Correlations with *Cattell Infant Intelligence* scores are presented. Considerable technical data on the original Albert Einstein Scale is available (8).

Goodenough, F. L., & Others. *Minnesota Preschool Scale.*

From: American Guidance Service, Inc., Publishers' Building, Circle Pines, Minnesota 55014 (c1938, c1940).

Assesses development of mental ability in children of age 6 months to 5 years. Two parallel forms are available. Items pertain to pointing out parts of the body or objects; naming familiar objects; copying; imitative drawing; block building; response to pictures; Knox cube imitation; obeying simple commands; comprehension; discrimination, recognition, or tracing of forms; naming objects from memory; colors; incomplete pictures; picture puzzles; digit spans; paper folding; absurdities; vocabulary; imitating clock hands; and speech. The test has verbal, non-verbal, and total scores for children 3 to 5 years of age, and

total scores for younger children. The instrument is individually administered and paced. The examiner should have considerable experience in the testing of young children and some practice with the test materials. Age C-score and percent placement norms and I.Q. equivalents are available. Inter-form reliabilities, but no other technical data, are reported.

Gouin Décarie, T. *Objectal Scale.*

A copy of the instrument may be examined in: Therese Gouin Décarie, *Intelligence and affectivity in early childhood.* New York: International Universities Press, Inc., 1965.

Assesses development of object relations in infants from birth to age 24 months. The *Scale* is based on Piagetian theory and object relations in contemporary psychoanalytic theory. The items concern specific reaction to feeding, automatic or differentiated smile, ability to wait, negative emotion on the loss of a human being and the loss of an inanimate object, signs of affection, compliance with requests and prohibitions, and subtle discriminations of signs of communication. Scoring is on a 13-point scale along the continuum narcissistic, intermediate, objectal (a), and objectal (b) periods. The test is untimed, individually administered, and involves both the child and his mother. The examiner should have experience in the testing of infants. Correlations with mental age, chronological age, the five subscale scores of the *Griffiths Abilities of Babies Scale*, and *Piaget Series* (described next) scores are reported. Neither norms nor reliability studies are available.

Gouin Décarie, T. *Piaget Series.*

A copy of the instrument may be examined in: Therese Gouin Décarie, *Intelligence and affectivity in early childhood.* New York: International Universities Press, Inc., 1965.

Assesses the development of the object concept, according to Piaget's criteria (24), in infants from birth to 18-20 months of age. The items concern visual accommodation to rapid movements, reconstitution of the whole, active search for the vanished object with a grasping move, active search without and with a sequence of visible displacements, active search without and with a sequence of invisible displacements, and systematic use of representation. Scoring is on a 9-point scale along the continuum of the six stages outlined by Piaget. The test is untimed and individually administered. The examiner should have considerable experience in the testing of infants and some practice with the test materials. Correlations with mental age, chronological age, the five subscale scores of the *Griffiths Abilities of Babies Scale*, and *Objectal Scale* scores are reported. Neither norms nor reliability studies are available.

Graham, F. K., & Others. *Behavioral Differences Between Normal and Traumatized Newborns Test.*

From: Frances K. Graham, Department of Psychology, University of Wisconsin, Madison, Wisconsin 53706 (c1956).

Designed to differentiate normal from traumatized newborns of age 1 to 5 days and to identify those neonates likely to evidence brain damage at a later date. The instrument includes the determination of pain threshold (electric shock), a 9-item maturation scale, a 10-item vision scale, an irritability rating, and a rating of muscle tension. The maturation scale assesses head reaction, simulating crawling, pushing feet, auditory reaction, and the like. The test has subscores in each of the five areas mentioned above. A few props are needed. The procedure is untimed and individually administered. The examiner should have experience in the testing of infants. Age norms for each subtest are reported. Cutting scores for the identification of the traumatized and evidences of concurrent validity are presented. Split-half (pain threshold test only), test-retest, and inter-scorer (all tests except pain threshold) reliabilities are available (17).

Griffiths, R. *Griffiths Abilities of Babies Scale; Griffiths Mental Development Scale.*

From: Lawrence Verry, Inc., 16 Holmes Street, Mystic, Connecticut 06355 (c1954).

Measures intelligence or degree of ability in infants from birth to 2 years of age. There are three behavior items on the total scale for each week of life in the first year and two for each week in the second year. These are arranged so that there are 52 items in each of five subscales: locomotor, personal-social, hearing and speech, eye and hand, and performance. Scoring gives a mental age and general quotient for the total scale and each subscale. The test is untimed, individually administered, and based on observing the baby in certain situations. The examiner should have considerable experience in the testing of infants and some training with the test materials. Testing time is about 20 minutes. A number of props are needed. Developmental profiles for both normal and abnormal babies are available (18). Test-retest reliabilities and evidence of construct validity are reported.

Hoopes, J. L. *Infant Rating Scale.*

From: Child Welfare League of America, Inc., 67 Irving Place, New York, New York 10003 (c1967).

Identifies danger signals for later developmental problems in infants of age 4 to 13 weeks. The *Scale* was developed for use in adoption agencies. Information measured includes the following: background (intelligence of parents, siblings, half-siblings, and other family members; education of parents), medical information on the mother during the course of the pregnancy, birth history, early behavior of the infant (eating, sleeping, disposition, body strength) and baby's medical progress. Items are of these types: rating scale, multiple choice, yes/no, and completion questions. The instrument is untimed and based

on individual observations and agency records. The examiner should have experience in the testing of infants. Danger signal frequencies for 158 infants are reported. Inter-rater reliability values, relationships with *Gesell Developmental Schedule* ratings (concurrent), and relationships with *Stanford-Binet, 1960, Form LM* I.Q.s, *Graham Block Sort Test* scores and picture analogies subscores of the *Nebraska-Hiskey Test* (predictive at 4 years of age) are available.

Irwin, O. C. *Irwin Speech Sound Development Test.*

A copy of the instrument may be examined in: O. C. Irwin, Phonetical description of speech development in childhood in L. Kaiser (Ed.), *Manual of phonetics*. Amsterdam, Netherlands: North-Holland Publishing Company, 1959. Pp. 403-25.

Measures speech sound development or phoneme status in children from birth to 30 months of age. Phonemes uttered are recorded for a large number of sets of 30 breaths (data is based on recordings of 27-181 sets) and classified as to type. Scores include mean number of types emitted and mean frequency of all phonemes, vowels, consonants, and each type of phoneme. The test is untimed and based on individual observations or recordings. The examiner needs experience in the recognition of phoneme types. Age mean and percentile curves for phoneme type and phoneme frequency, and age rates for each individual phoneme are reported (21, 22). Inter-observer agreement rates, correlations of phoneme type and vowel, consonant, and phoneme frequency with *Kuhlmann Intelligence Test* scores, and comparisons of phoneme status scores for samples differing with regard to race, sex, sibling influence, parental occupational status, feeble-mindedness, reduced speech stimulation, and brain damage are available.

Kahn, T. C. *Kahn Intelligence Tests: Experimental Form (KIT:EXP).*

From: Psychological Test Specialists, Box 1441, Missoula, Montana 59801 (c1960).

Designed to be a culture-free test of intelligence for persons from birth through adulthood. The instrument has a brief placement scale for the determination of the proper entry point on the main scale. The main scale has six items at each 1-year age level from 0-1 years to 13-14 years. The score from the main scale gives mental age or I.Q. The infant items deal with sensory-perceptual acuities, object permanence, imitation, motor development, size concepts, and geometric shape discrimination. *KIT:EXP* also has short special scales on concept formation, recall, and motor coordination and special scales for use with sign language and for use with the blind. A number of plastic objects and a felt strip are required. The test is individually administered and paced (some items are timed). The examiner should have experience in the testing of young children and some practice with the test materials. Test-retest reliability and the correlation with *1937 Stanford-Binet* scores are reported for a sample of 23 children (23). No norms are available.

Kuhlmann, F. *Kuhlmann-Binet Intelligence Scale.*

A copy of the instrument may be examined in: F. Kuhlmann, *A handbook of mental tests.* Baltimore: Warwick & York, Inc., 1922.

One of the Binet family of intelligence tests. It is of interest here because Kuhlmann not only revised the Simon-Binet Scale, but extended it downward to include infants as young as 3 months. The instrument has five items (tests) for each of the following age groups: 2, 6, 12, 18, and 24 months. The tests deal with coordination, balance, motion, reactions to stimulation, imitation, recognition, speech, and responses to simple commands. Many of the items have alternate tests which may be used and some require repeated trials if success is not achieved on the first trial. Some props are required. The test is untimed and individually administered. The examiner should have experience in the testing of infants and some practice with the test materials. The child's mother or a nurse is required for some of the tests. The scores give mental age or intelligence quotient. Goodenough (16) reports validity studies, and split-half and test-retest reliabilities on the instrument.

Kuhlmann, F. *Kuhlmann Tests of Mental Development.*

A copy of the instrument may be examined in: F. Kuhlmann, *Tests of mental development.* Minneapolis: Educational Test Bureau, 1939.

Measures intelligence in children from age 3 months to 16 years. The instrument has 28 items (tests) for infants up to age 2 years and ten for age 2 to 3, each item age placed to the nearest month. Some items have multiple parts and some may require repetitions. The infant tests deal with coordination, motion, balance, reactions to stimulation, recognition, speech, and obeying commands. Supplementary items are available. Some props are required. At the infant level, the measure is untimed and individually administered. The examiner should have considerable experience with the testing of young children and some practice with the test materials. The total score may be expressed as a mental level score based on the Heinis mental growth curve; mental age; or intelligence quotient. No other technical data was available for review.

Maxfield, K. E., & Buchholz, S. *Maxfield-Buchholz Scale of Social Maturity for Use With Preschool Blind Children; M-B Scale.*

From: The American Foundation for the Blind, Inc., 15 West 16th Street, New York, New York 10011 (p1957).

Measures social competence or social maturity in blind children from birth through 5 years of age. There are 95 items, each placed within the year level of its expected performance. No more than 20 items are included in any one age range. The items are categorized as Self-help General, Self-help Dressing, Self-help Eating, Communication, Socialization, Locomotion, and Occupation. The present scale is an outgrowth of the Maxfield-Fjeld adaptation of the *Vineland Social*

Maturity Scale. It is completed by interviewing a person who knows the child well and by observing the child if he is present during the interview. The examiner should have considerable experience with the psychological testing of small children and with the diagnostic interviewing of both children and parents. The placement of items within the year of expected performance allows the easy calculation of a social age and social quotient (social age divided by chronological age). Construct validity is inferred due to level of expected performance being based on what blind children are actually found to do at the various age levels. No reliability studies are reported.

Ricciuti, H. N. *Ricciuti Object Grouping and Selective Ordering Tasks.*

From: Henry N. Ricciuti, Department of Human Development, Cornell University, Ithaca, New York 14850 (p1963).

Measures development of categorizing behavior in children from age 12 months to 40 months. In each task, the child is presented with eight objects, four simple objects of one kind and four of another, in a standard arrangement on a tray. The child is told to play with them, to "fix them all up." No further instructions are given except to encourage him to play if he becomes disinterested. The test has four tasks: multiple-contrast, simple size-contrast, complex size-contrast, and form-contrast. Coding of behavior is based on types of selective ordering (order in which the objects are manipulated or displaced) observed and types of object grouping observed. The tasks are individually administered and timed with a maximum of 2 1/2 minutes being allowed for each. Some experience in scoring is needed. Categorizing behavior type rates for each task for children aged 12, 18, 24, and 40 months are reported (25, 26). Evidence of content validity is presented. No reliability studies are available.

Ringwall, E. A., & Others. *Pre-Linguistic Infant Vocalizations Analysis.*

From: Egan A. Ringwall, Department of Psychology, State University of New York, Main Street, Buffalo, New York 14214 (p1965).

Designed to measure vocalizations in infants from birth to 2 years of age. It is hoped to establish a link between the measure and linguistic development and later psychological and intellectual status. The vocalizations are coded on the basis of the following distinctive features: (1) sound vs. silence, (2) length of sound, (3) length of silence, (4) direction of air stream (egressive vs. ingressive), (5) air passage (oral vs. nasal), (6) muscular tension, (7) force of air stream, and (8) vocal cord vibration (voiced vs. voiceless). Coding is done by tape recording the vocalizations. Coders need some training and experience. Normative data on 40 3-day olds based on 4.2 minutes of observation per infant is reported (27). Included are mean number of sounds per 5-second segment and frequency rates on the other seven distinctive features. Studies of inter-rater reliability are reported. No other technical data was available for review.

Slosson, R. L. *Slosson Intelligence Test for Children and Adults (SIT).*

From: Slosson Educational Publications, 140 Pine Street, East Aurora, New York 14052 (c1961, c1962, c1963).

Assesses mental ability in infants, children, and adults. One item is available for each 1/2-month interval for infants up to 2 years of age, one for each month for ages 2-5, one for each 2 months for ages 5-16, and one for each 3-month period for ages 16-27. The examinee proceeds with items until he has missed ten in a row. The resultant score is the examinee's mental age. To test infants, some blocks or spools, a rubber ball, and some toys are needed. The test is untimed, individually administered, and paced. If the *SIT* is used with babies, the examiner should have considerable experience in the testing of infants. Testing time is 10-20 minutes. Test-retest reliabilities, correlations with *Stanford-Binet, Form L-M,* and *Cattell's Infant Intelligence Scale* scores and comparisons with the *Wechsler Intelligence Scale for Children* and the *Wechsler Adult Intelligence Scale* scores are reported.

Stutsman, R. *Merrill-Palmer Scale of Mental Tests; Merrill-Palmer Preschool Performance Tests.*

From: C. H. Stoelting Company, 424 North Homan Avenue, Chicago, Illinois 60624 (c1926-1948).

Assesses mental development and personality variables in children from age 18 months to 71 months. The instrument consists of 93 tasks ordered according to difficulty. The tests may be classified as language, all-or-none, form boards, picture tests, or other tests of motor coordination. Many props are needed. The total score may be converted to mental age, standard deviation scores, or age percentile ranks. While the tests are in progress, the examiner observes and rates self-reliance, self-criticism, irritability toward failure, degree of praise needed for effective work, initiative and independence of action, self-consciousness, spontaneity and repression, imaginative tendencies, reaction type, speech development, and dependence on parent. The instrument is individually administered and paced. The examiner should have considerable experience in the testing of young children and some practice with the test materials. Some tasks are timed. No reliability or validity studies are reported.

Thomas, A., & Others. *Behavioral Individuality in Early Childhood Measure.*

From: Alexander Thomas, Department of Psychiatry, New York University School of Medicine, 550 First Avenue, New York, New York 10016 (c1963).

Assesses the organismic characteristics or reactivity factors in infants from age 3 months to 2 years which contribute to the child's later psychological individuality. The instrument has scales and subscores in the following nine categories of behavioral functioning: activity level, rhythmicity, approach or withdrawal responsivity, adaptability, intensity of reactions, threshold of responsiveness, quality of mood, distractibility, and attention span and

persistence. Scoring is based on interviews with the parents which include semischeduled questions. Some experience with diagnostic interviews is needed. Each interview lasts from one to two hours during the first year and from two to four hours during the second year of life. Typical scored interview protocols are available. Selected subscore frequencies from a longitudinal study of 80 infants are reported (30). Studies of inter-scorer and intra-scorer reliability, relationships between interview and direct observation scores, stability of ratings over time (chi square test), and predictive validity based on preponderance ratings (binomial test), rank ordering (Friedman test), and percent-rank indices (rho correlations) are available.

White, B. L., & Held, R. *White-Held Visually-Directed Prehension Test.*

From: Burton L. White, Laboratory of Human Development, Graduate School of Education, Harvard University, Cambridge, Massachusetts 02138 (c1967).

Assesses visually-directed prehension in infants from age 1 month to 6 months. The procedure consists of ten minutes of observation of spontaneous behavior (pretest) during which the observer(s) remains out of view, and then a 10-minute standardized test session during which a stimulus object is used to elicit prehensory responses. These responses are classified into ten categories, from swipes at the object to top level reach, which appear in a chronological sequence. The party toy used as the stimulus is needed. The test session is timed and based on individual observations. Some experience in the testing of infants is needed. The median and the range of the age of the first occurrence of each of the types of visually-directed reaching is reported (31). A detailed discussion of the normative sequence is presented. No other technical data is available.

- - - Child Development Project of the Albert Einstein College of Medicine, *Albert Einstein Scales of Sensori-Motor Development.*

From: Sibylle K. Escalona, Child Development Project, Department of Psychiatry, Albert Einstein College of Medicine of Yeshiva University, 1300 Morris Park Avenue, Bronx, New York 10461.

Assesses early cognitive development in terms of sensorimotor stages in infants. The scales are based on Piaget's theory and published work. Three scales (prehension, space, and object permanence) are complete, and a fourth (casuality) is under development. The Prehension Scale is for infants aged 3 weeks to 6 or 7 months; the Space and Object Permanence Scale for infants aged 5 months to 2 years. The Prehension Scale (15 items) reflects developmental advances in sensorimotor intelligence from the simplest primary reactions through the more varied and complex primary circular reactions to the secondary circular reactions. The Space Scale (21 items) indicates the changes concerning the infant's capacity to adapt to and comprehend the objective properties of physical space. The Object Permanence Scale (18 items) reflects the sequence of stages in the establishment of the object concept; that is, learning to conceive of things as external, relatively permanent, and existing independently of oneself. A number of props are needed. The test is untimed and individually administered. The examiner should have considerable experience with the testing of infants and some practice

with the test materials. The mother or a mother substitute is present during the test. An observer-scorer is also needed. Inter-scorer reliabilities, longitudinal studies of the sequence of acquisition of behaviors, and cross-sectional validation studies are reported (8).

- - - Shield Institute for Retarded Children, *Shield Speech and Language Developmental Scale*.

From: Shield Institute for Retarded Children, 1800 Andrews Avenue, Bronx, New York 10453 (c1968).

Measures speech and language development in children from age 3 months to 60 months. Although the measure was constructed for use with retarded children, the age placement of the items is that of normal children. There are three items at each age level, one in each of the following areas: receptive, expressive, and sound development. Items are available at these levels: monthly from age 3 to 10 months, quarterly from age 12 to 24 months, and 30, 36, 48, and 60 months. The instrument has receptive age level and quotient, expressive age level and quotient, and total scores. The test is untimed and based on individual observations or testing and parent interviews (28). The examiner should have experience in the testing of infants. No technical data was available for review.

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